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Research for Innovation and Equity

Summative Evaluation: IRCI

A Review of the International Research Chairs Initiative (IRCI)

Halla Thorsteinsdóttir
Director, Small Globe Inc.
halla@smallglobe.ca

Jennifer Mary Bell
Team Leader, Small Globe Inc.
Jennifer@smallglobe.ca

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Executive Summary

The International Research Chairs Initiative (IRCI), established jointly by the International Development Research Centre (IDRC) and the Canada Research Chairs (CRC) program, stimulates research talents in low-and-middle income countries (LMICs) and Canada. It promotes cooperation between researchers judged to be of a high calibre from a wide variety of disciplines in these countries. Through this cooperation, the IRCI program administered grants of C$ 1 million to each of eight research teams, funding them for five years. The key assumption of the program is that by supporting research by strong university researchers in LMICs, and by engaging them in cooperation with leading university researchers in Canada, their respective capacities are enhanced. The teams were thus able to undertake a joint research program, mentor students, and produce knowledge relevant to applied practice, policy, or commercialization.

The purpose of this summative evaluation was to assess the overall design of the IRCI program and evaluate its impacts. This includes the program's performance, relevance and future potential. We conducted a systematic data collection process involving:

- in-depth interviews with all 16 research chairs from LMICs and Canada about the impacts of their collaboration and experience with the program; and
- a survey sent to 219 students who had submitted theses or had post-doctoral fellowships that asked them about their experiences and impacts of the IRCI program.

In addition, we triangulated our research results through analysis of background documents, and by using scientometric data.

Performance

We evaluated the performance of the program with respect to research, education and knowledge mobilization, respectively, which reflect the core objectives of the IRCI program.

Research The IRCI program stimulated substantial knowledge production in a wide range of areas, spanning diverse academic fields. Even though the IRCI program supported only eight projects, it was substantial in its reach, and brought about knowledge production and knowledge flow among hundreds of people. The work was disseminated both globally, often in high-impact journals, and also through more national or regional vehicles. The program led to new opportunities in building international research networks, broadened the scope of the researchers, enhanced global recognition of their research, and advanced their skills in working with users of their research results.

Education One aim of IRCI was to mentor the next generation of scholars and practitioners by providing training and fieldwork opportunities to students. The program trained nearly 400 students from a range of LMICs and from different parts of Canada. Furthermore, these students judged the training to be of high caliber, and to have enhanced their skills and

opportunities. The integration of research and training was an important component of the IRCI program, and is missing in many new programs in this area. Also by connecting Canadian and LMICs students, the possibility of future cooperation is enhanced, positively affecting both knowledge production, and innovation in Canada.

Knowledge mobilization A further objective of the IRCI program was to identify new avenues for knowledge, policy, or technology transfer. The program successfully stimulated its researchers to build bridges with various types of users of their research results, ranging from local stakeholders to bring about grassroots science-based policy change, to working with regional government agencies, to advising international organizations. There was also novelty for some in working with industry, and for another, in forming a company. From the interviews, it was clear that working with external stakeholders was, in many cases, a new experience for the chair-holders. The implementation of a number of related policies and practices speaks to the strength of IRCI's knowledge mobilization efforts.

Relevance

We evaluated the IRCI program in terms of its relevance in informing policy and practice, its importance in achieving the outputs and outcomes of the research teams, and its key strengths and weaknesses in comparison with other similar programs.

Relevance for policy and practice. The results of the IRCI cooperation were well received by governments in LMICs and by other external stakeholders, including a few industry partners, judging by their adoption of policies, practices and technologies. This reflects a high relevance of the program to policy and practice across a wide range of organizations. Based on their cooperation the chair-holders have also been successful in raising additional funding, often from governmental sources. This further reflects the policy relevance of the research, which increases the chances for its sustainability.

Role The IRCI program played a key role in strengthening research and training in LMICs and allowed chair-holders to engage proactively with the users of the research results. Without the funding, it is unlikely the program would have been able to achieve the impacts in training, research and knowledge mobilization it has had.

Key strengths and weaknesses Compared to other programs involving research councils and development organizations, the key strength of the IRCI program was its ability to encourage relatively equal collaboration among the chair-holders, which can be a challenge in collaboration involving high and low/middle income countries. A further strength was the integration of teaching and research, which provides rich education potential. Some of its weaknesses include its small size, with a budget that is only a fraction of that of other programs. As a result, the impacts of the IRCI program were more modest. Another weakness of the program was lack of formal communication among the supported projects, and thus lack of cross-fertilization among the researchers. In particular there seemed to be

scope for cross learning in strategies for engaging with different types of stake holders in knowledge management activities as well as in managing multi-year relatively large scale international projects.

Based on our evaluation, we feel that the management of the IRCI was rigorous and sound. We, however, recommend that IDRC be more transparent in defining what falls under key development challenges, and make greater efforts to communicate this at all stages of the program. As mentioned above, one of the key objectives of the program is to support joint research by LMIC and Canadian chair holders to address key development challenges. However, the proposal review process relied on external review, which may have weighted the review in favor of scientific merit rather than development application. Although there were efforts to align the IRCI with IDRC's three program areas, we suggest that in future programming of this nature, IDRC should be more explicit about what falls within the realm of key development challenges. With increasing emphasis on private sector involvement, we believe there is a heightened need to be transparent about IDRC's agenda.

Recommendations for Future Programming

Based on our summative evaluation, we identified some lessons for future programming. We recommend that IDRC should:

1. Look at ways to continue its cooperation with the Tri-Councils and support international research chairs in LMICs, as building these bridges is important for addressing challenges in an increasingly connected globe.

2. Consider the merits of the IRCI's flexible approach and look at ways to expand it to other IDRC programs, particularly the arrangement of open calls.

3. Fully investigate the need for the research team to have had prior research cooperation before undertaking large-scale projects jointly.

4. Continue to emphasize training for long-term impacts, including in knowledge generation and commercialization.

5. Offer more opportunities for grantees to meet to encourage cross-fertilization among research teams.

6. Develop a transparent approach to define and communicative what constitute key development challenges and priorities for LMICs, while at the same time retaining an open and flexible programming approach.

7. Open such programming to all university researchers in Canada to increase the pool of high quality applicants that provide the expertise in need.

8. Explore trilateral collaboration with emerging economies and LMICs.

Acknowledgements

We gratefully acknowledge the support of IDRC staff, particularly David O´Brien and Amy Etherington, for providing us with extensive background material and clarifications whenever needed. We further thank our tireless Survey Director, Fjóla Evans; our translators, Patricia Boushel, Rong Li and Anabela Pereira; the many students and post-doctoral fellows who took the time to fill out our survey; and our interviewees from around the world, including all the IDRC and CRC chair-holders, and representatives from CRC and IDRC, who, despite time differences and hectic schedules, were more than forthcoming with their time and insights. The opinions and any possible errors in this report are solely those of the authors, and do not reflect the positions of IDRC or CRC.

1. Introduction

1.1 Background

The International Research Chairs Initiative (IRCI) was launched jointly by the International Development Research Centre (IDRC) and the Canada Research Chairs (CRC) program to stimulate research talents in low-and middle-income countries (LMICs) and foster international research cooperation. It is funded by the Research Partnership Challenge Fund at IDRC. The Challenge Fund was established in 2005 with a mandate to develop and fund joint programs between IDRC and Canadian or international research funding agencies aimed at global issues and themes of particular relevance to LMICs. The fund reflects a policy emphasis by the Canadian Federal government beginning in the mid-2000s to leverage domestic science and technology for international development and foreign policy goals.

The CRC program focuses on supporting research professorships at Canadian universities in order to "to attract and retain some of the world's most accomplished and promising minds."[1] It was established in 2000 and has filled, as of April 2015, 1650 Canada Research Chairships across the country.[1] IDRC shares CRC's interest in emphasizing and leveraging research talent. This emphasis is reflected in one of the founding objectives listed in the IDRC Act, which states that that the Centre's objective is "to enlist the talents of natural and social scientists and technologists in Canada and other countries."[2] The Act also lists another important objective for the IRCI program: "to foster cooperation in research on development problems between the developed and developing regions for their mutual benefit."

In light of a policy emphasis on cooperation among funding agencies, IDRC started negotiations with CRC to develop a joint program that would involve collaboration between CRC holders in Canada and university researchers in LMICS. The resulting IRCI program used the CRC concept internationally, and established research professorships at universities in LMICs. It responded to increasing demand at Canadian universities to undertake international cooperation, as well as demand from university researchers in LMICs for North-South cooperation. The program aimed to generate mutual benefits for Canada and the LMICs involved. By working together with the CRC, the new program allowed these organizations to support larger-scale projects than they could support by themselves, and made them better-equipped to address shared global challenges.

Through the IRCI program, IDRC and CRC established so-called International Research Chairs, sometimes called IDRC chairs, at LMICs universities collaborating with Research

[1] Government of Canada. *Canada Research Chairs: About Us.* http://www.chairs-chaires.gc.ca/about_us-a_notre_sujet/index-eng.aspx
[2] Government of Canada. *International Development Research Centre Act*, R.S.C. 1985, c. I-19.

chair-holders in Canada. The program was open to a wide range of topic areas, and the chairs could come from a wide variety of fields, but the goal was that they aligned with IDRC's three program areas, namely, agriculture and environment; social and economic policy; and technology and innovation. Each research team had up to $1 million over five years to work on research addressing key development challenges and to train students. IDRC fully funded the new program, but the CRC chairs had prior research funding they could bring to the cooperation with the IDRC chairs. As the CRC chairs were previously funded by the CRC program, they received considerably less funding from IRCI, or 25% versus 75%, than the IDRC chairs received. The assumption was that they could bring their own research funds into the collaboration with the IDRC chairs, but the IRCI program would cover additional costs required by the cooperation, such as travel and meeting costs. CRC also managed the application process and looked after the review process.

1.2 Objectives and Assumptions

In 2008 the IRCI program was launched by IDRC and CRC. The objectives of the program were to:

- Create opportunities for chair-holders in LMICs and in Canada to implement joint research programs that address key development challenges;
- Mentor the next generation of scholars and practitioners by providing unique training and fieldwork opportunities to students; and
- Identify new avenues for knowledge, policy, or technology transfer.

The main assumption of the program is that by supporting the research of promising university researchers in LMICs, and by engaging them in cooperation with leading university researchers in Canada, their capacity to address development challenges, mentor students, and produce knowledge relevant to applied practice, policy, or commercialization is strengthened. Both the added resources for research, and the collaborative aspect, aimed to enhance the positions of already-strong researchers and lead to capacity-building and knowledge mobilization.

Figure 1 presents a logic model for the IRCI program. It depicts the emphasis the program places on strengthening research capacity in developing countries, mentoring students, and on novel means of knowledge mobilization. It further demonstrates the wide ranges of outputs, outcomes and impacts promoted by the program.

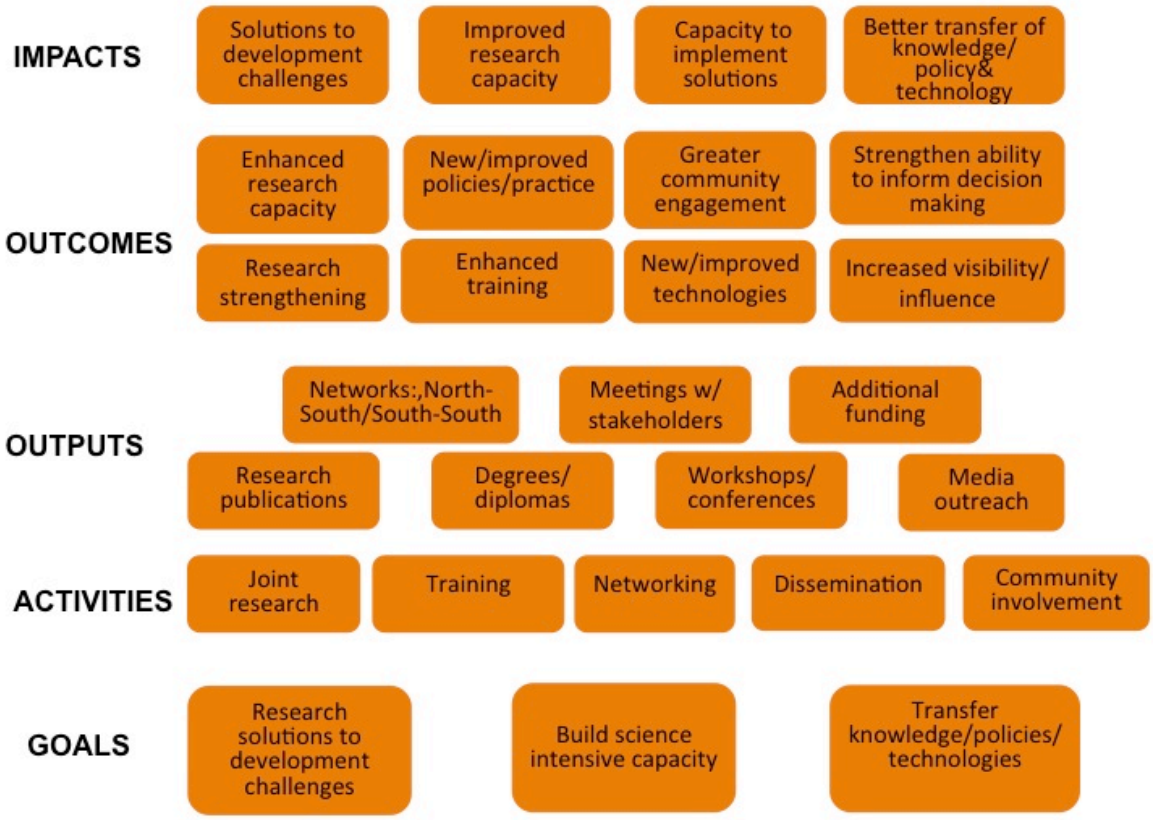

Figure 1. Logic Model for the IRCI Program

Source: Small Globe Inc. based on IRCI program documentation.

1.3 Application Process

The IRCI was officially launched at the end of 2007. The application process consisted of two stages. The first stage was submission of a Letter of Intent. The letters were submitted jointly in February 2008 by pairs of researchers in a LMIC, and CRC chairs in Canada. The CRC program arranged for them to be externally peer-reviewed by subject experts and a multidisciplinary committee. A total of 104 letters were submitted, and 22 teams were invited to submit final applications by the fall of 2008[3]. The applications were processed through CRC-based external review, and IDRC funded the top eight applications based on the panel's recommendations and consultation with the CRC program. There was sizeable demand for a program supporting this type of collaboration arrangement, judging by the large number of Letters of Intent that were submitted. The original intention was to choose five projects to support, but the quality of the applications was so high that a decision was made to increase the number of projects to eight.

[3] IDRC (2009) Research Without Borders: The International Development Research Centre and the Canada Research Chairs Program Support International Partnerships. News release.

1.4 Purpose of the Evaluation

The purpose of this evaluation is to analyze the overall design of the IRCI and assess its impacts, including the initiative's performance, relevance and future potential. It was commissioned by IDRC to follow an agreement made with the CRC program. IDRC is the primary intended user of this evaluation, but other users include CRC and the involved researchers. The objectives of the evaluation are to:

- Evaluate to what extent IRCI has achieved its objectives, and what factors/ conditions made it possible to meet these objectives or prevented them from doing so.
- Assess the extent to which the collaboration between Canada and LMICs supported by IRCI added value and contributed to the program meeting its objectives.
- Provide detailed recommendations on IDRC's future programming, including specific guidance on how best to structure programs supporting collaboration between Canada and LMICs.
- To account to the IDRC Board of Directors for program expenditures, inform reporting to government and the public, and provide advice on future programming directions.

We had many guiding questions, focusing on the performance of the IRCI, its relevance, the value added by the international collaboration, and lessons for future IDRC programs. These questions are as follows:

Performance

- Did IRCI achieve its objectives, and if so, how did they do it?
- Was the design of the program adequate?
- Were the initiatives properly implemented?
- Was IRCI an effective vehicle for developing contacts, networks and new opportunities of value to members of the research teams?
- Are the quality of the training and the number of students trained commensurate with the original objectives?
- Did the training environment enhance graduate students' learning experience?
- Did the research teams access or leverage new funding or partnerships to deepen their research and/or strengthen their ability to inform decision-making?

Relevance

- What are the strengths, weaknesses and unique features of the design of the IRCI program compared to existing programs in Canada and in other countries?
- What outputs and outcomes did the Canadian and international partners achieve that might not have been achieved without funding support?

- For non-academic partners and audiences, how relevant are the project outcomes for informing policy, practice and technology development? Are their views consistent with the views held by lead researchers?

Lessons for Future Programs

- Which program characteristics, if any, would the lead researchers and those managing projects redesign, if the funding opportunity were renewed? What similar programs are informants aware of that might assist IDRC in designing and evaluating future programs?
- What important lessons were learned in developing international scientific collaboration? What was the experience of lead researchers and those managing networking activities? Do Canadian and international research collaborators hold similar perspectives?

As this is a summative evaluation, we have focused on evaluating the impacts of the IRCI program. Promoting change and innovation in science-based fields involves operating within complex systems, where it can be challenging to identify the direct impacts of a single project or a program. It is important to emphasize that analyzing the impacts of this program is not a linear process, but rather, needs a systemic perspective and to look for alignments of different components within innovation systems in the participating countries, as well as among the systems.

Innovation systems are complex structures that include flows of knowledge within and between organizations, institutions and the socio-economic contexts in which they are embedded[4]. These relationships determine the rate and direction of innovation from both science-based and experience-based learning. The conceptual framework used in this evaluation requires analyzing program impacts from an innovation systems perspective.

For interventions, such as research collaborations, to have effects, attention needs to be paid to how they fit into wider innovation systems in participating countries, and how systemic alignments can be calibrated in order for knowledge and other resources to flow smoothly between the countries. By looking at the collaborations supported by the IRCI program from an innovation systems perspective, and understanding them as interactions within innovation systems, we thus gain a better understanding of how cooperation can have impact and contribute to new development solutions.

[4] See e.g. Freeman, C. (1987). *Technology Policy and Economic Performance-Lessons from Japan*. London: Pinter Publishers; Lundvall, B. Å. (1992). *National Systems of Innovation: Towards a Theory of Innovation and Interactive Learning*: Pinter London.; Lundvall, B. Å , Vang, J., Joseph, K.J. and Chaminade, C. (2009). Innovation system research and developing countries. In B. Å. Lundvall, K. J. Joseph, C. Chaminade & J. Vang (Eds.), *Handbook of Innovation Systems and Developing Countries*. Cheltenham, UK and Northampton MA, USA: Edward Elgar.

2. Methodology

2.1 Interviews with Chair-holders

To gain insight on the IRCI program, we conducted semi-structured interviews with all the chairs (both IDRC and CRC chairs) using a standard interview instrument (see Appendix 2). The impacts of research programs can take years to be realized. In order to gauge the early impacts of the IRCI program, we relied on the perceptions of those directly involved, particularly the chair-holders. Those involved can provide insights into what approaches worked, the impact of their work, and what needs to be done to improve the program. Interviews with the chair-holders were therefore judged to be of particular importance for the evaluation.

During these telephone interviews, the chair-holders were asked about what motivated them to apply to the program, how they saw the outcomes of their projects, the impact on students and trainees, and how well they felt the program was designed and implemented. The interview instrument also included three quantitative questions on a Likert scale asking about the overall significance of the work, the project's effects on their own research, and the role of the IRCI program in achieving applied outcomes.

These interviews formed a core source of data for the evaluation, and gave the chairs a chance to be candid and forthcoming about their experiences of the program. We probed for critical reflection from interviewees as relevant. The interviews, which were conducted over a period of three weeks in June, 2015, lasted from 30—90 minutes. The interviewees could chose if the interviews were conducted in English or French, and almost all of them chose English. Small Globe staff conducted a total of sixteen interviews with the chairs for our evaluation of the IRCI program.

2.2 Survey of Trainees

At the same time that Small Globe staff arranged and conducted interviews with chair-holders, we also asked them to provide us with names and contact information for thesis students and post-doctoral fellows whose work was supported by the program. Training constituted a large emphasis of the IRCI program, and we therefore felt it was important for the evaluation to collect data on trainees' experiences and evaluations of the program. As there were approximately 400 trainees supported by the program, we felt that administering an online survey to all thesis students as well as those who had a post-doctoral fellowship, was a suitable approach.

Our motivation for choosing only thesis students and post-doctoral fellows was the need to be sure that the involvement with the program of those we surveyed had been substantial, more than, for example, participation in a workshop. With a final list of 219 trainees, we sent them an internet-based survey by e-mail. The survey was made available in four

languages (English, French, Portuguese, and Chinese) to reach as many trainees as possible. In the survey (see Appendix 3) students and post-doctoral fellows were asked about the impact of support from the IRCI program on their education, employment, and network of contacts. In total, 114 trainees responded to the survey, resulting in a response rate of 52%. The results of the survey are described in Section 3.1.2.

2.3 Interviews with Program Managers

Once the interviews with Principal Investigators were completed, and subjected to preliminary analysis, we conducted four interviews with program staff from IDRC and the CRC program about the genesis, overall aims, and perceived outcomes of the IRCI program to gain insights into the wider context and expectations of the program. Using a semi-structured interview instrument with questions targeted to each organization's role, we asked questions concerning their views of the financial arrangements of the IRCI program, the role of the private sector, and whether these interviewees would like to see a continuation of the program.

2.4 Background Document Analysis

Small Globe staff reviewed background materials, such as applications, program reports and documents related to the development of the IRCI program, before conducting interviews with chair-holders, and again during the analysis phase of the evaluation. We also carried out a scientometric analysis of published and submitted journal articles listed in the final technical reports of the IRCI projects. We examined each paper and noted if it involved co-authorship of the IDRC and CRC chairs as a reflection of the extent of their collaboration.

We also conducted an environmental scan to look for similar programs with lessons that might be relevant to the evaluation. The programs we focused on in this environmental scan were joint programs involving research councils and overseas development organizations (ODAs).

2.5 Limitations

This summative evaluation relied on extensive systematic data collection tools. However, we did not have the opportunity to conduct face-to-face interviews or field visits. Such interviews could have deepened our understanding of stakeholder perspectives, and given us opportunities to verify our findings with input from external stakeholders.

The program has recently ended, and it takes time for its impacts to be realized. We had, therefore, to rely heavily on interviews with chair-holders to assess the impacts of the IRCI program. As they were financially supported by IRCI, chairs may have had a tendency to portray the program and its impacts in an overly positive light and be reluctant to point out

any short-comings, despite our efforts to probe for critical reflection. Where possible, we tried to triangulate the interview evidence with other sources of data.

In addition, there has only been one round of the IRCI program, and it funded a total of only eight projects. Thus, our ability to draw conclusions about the overall approach was limited by the program's small size.

3. Evaluation Findings

3.1 Performance

3.1.1 Research

The IRCI program supports research in a wide range of areas and spans diverse academic fields. The participating IDRC chairs work in fields ranging from information and wireless technology, to nutrition and health policies and systems (see list of projects in Appendix A). The themes the projects focus on include pollution in coastal areas, managing fishing communities' resources, child nutrition, controlling infectious diseases, evidence-based health policy, tackling mining waste, internet access, and wireless communications. The IRCI program has widespread reach in LMICs, with IDRC chairs in Brazil, China, Ghana, Morocco, India and Uganda. Some of the projects had even wider geographical reach: for example, the project on evidence-based health policy, based in Uganda, included fieldwork in Burkina Faso, Cameroon, Columbia, Ethiopia, Peru, Uganda, and Zambia. Thus, in addition to encouraging knowledge flow between Canada and LMICs, the IRCI program also encouraged South-South learning.

A total of 251 journal articles have been published or accepted with support from the program, and 30 additional papers have been submitted and are going through the journal review process (Table 1). In addition, three books and 25 book chapters have been published as a result of the program's support. What is also noteworthy is the large number of theses, almost 200, that have been completed as a part of the IRCI program. This speaks to the significant educational role of the IRCI program, which will be discussed below.

The research teams differed widely in their knowledge production, with the most productive teams publishing 94 and 60 papers respectively, and the least productive publishing 5 and 8 papers. However, the IRCI program spans many different fields, as mentioned above, and publication patterns in different fields can differ widely, making it hard to draw conclusions about research outputs. There was substantial variety in the size of the teams, with some groups having many trainees who added to the publication output. Also, some of the teams reported in their final reports that they were still working on papers: for example, the project on evidence-based health policy stated in its final report that 18 additional manuscripts are now in preparation.

Table 1: IRCI Research Output

Project Title	Journal articles (published/ accepted)	Journal articles (submitted)	Conference papers	Presentations (non-academic)	Books	Book chapters	News-papers /Other	Theses
Battling Pollution in Coastal Areas	60	11	222	5	2	4	17	40
Helping Fishing Communities Manage their Resources	19	10	36	28	1	17	5	10
Tackling Mine Waste for Better Health	20	7	15	58	0	0	0	23
Breaking the Barriers to Internet Access	8	2	32	0	0	0	0	17
Getting Ahead of the Curve in Wireless Communication	22	0	22	0	0	0	0	7
Turning Health Research into Policy	23	1	35	6	0	0	17	11
Improving Child Nutrition	5	0	79	1	0	2	3	13
Controlling Infectious Diseases with Models and Math	94	0	6	0	0	2	0	76
Total	**251**	**31**	**447**	**98**	**3**	**25**	**42**	**197**

Source: Small Globe, Inc., adapted from IDRC internal document (M. Robertson and D. O'Brien (2015). IRCI and ICURA: Project Profiles and Synthesis of Emerging Results) and final technical reports.

A number of the publications from the IRCI teams were published in high-impact journals, including *The Lancet*, Nature's *Scientific Reports*, *PLOS One* and the *Communications of the ACM,* but others were aimed more at local or regional dissemination, such as the *Journal of the Brazilian Chemical Society*, the *Journal of Bioengineering* from China and the *South East Asian Journal of Tropical and Public Health*. Some of the publications resulting from the IRCI program won best paper awards at important conferences in their fields, such as the

International Conference on Computational Linguistics and the conference of the Association for Computational Linguistics.

In almost all cases, the two chairs knew each other well before they submitted applications to IRCI, and a few had had extensive collaboration in research (Interviewees 1, 4, 8,10,11,15). The fact that they were established collaborators may have made it easier for them to succeed with a project of this scale. In some cases, the CRC chairs were more senior researchers, working with more junior researchers in LMICs, such as with former students. In other cases, the Canadian chair-holders were more junior researchers than the international partners. Both arrangements appear to have led to fruitful collaborations. The two chairs in each project often provided complementary expertise to the collaboration. In some cases, one of the chairs would provide experience in more applied research, while the other would bring a more theoretical dimension (Interviewees 5,9,13,14). When we looked at the co-publication record of the IRCI chairs, 20% of published and submitted journal articles listed under the IRCI program are co-authored by the collaborating chairs. Even more papers included co-publications with team members across Canada and participating LMICs.

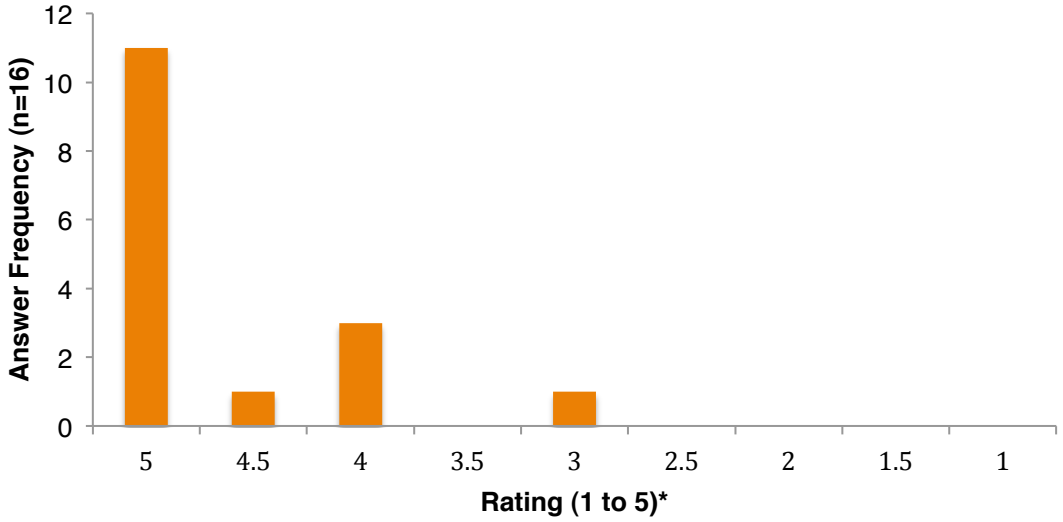

Figure 2. Chair-holders' Evaluation of the Significance of Their Research
*Rating scale: Participants were asked to rate the importance from 1 to 5, where 5 is very important, 4 is somewhat important, 3 is moderately important, 2 is of little importance, and 1 is not important. They were given an opportunity to choose a half number between any of these categories if they felt that this number better reflected their perception.
Source: Small Globe, Inc. based on interview data.

We asked the interviewees to evaluate, on a Likert scale from one to five, the significance of the outcomes of the research they did as a part of the IRCI program (Figure 2). Almost all of the respondents said that the research outcomes were 'very important". Many of the respondents showed enthusiasm when answering the question saying the outcomes were

"very, very significant." (Interviewee 8). When they expanded on their answers, it was clear that the criteria for what they felt were 'significant' outcomes spanned different types of outcomes, including academic outputs, training, and outcomes related to working with users of the research. One interviewee summarized the importance of the collaboration, saying "It is always better to work together and across borders. There is plenty of room for improvement on both sides, and ways to use resources more efficiently." (Interviewee 14)

A comment from one IDRC Chair summarized the progress of the research in the following way: "I think the outcomes are very significant. If one thinks about where we were at the beginning of the project in terms of [theme of research] and interest in [theme of research], we have moved miles ahead." (Interviewee 16).

We asked interviewees to evaluate the effects of the research collaboration on strengthening their own research. As can be seen in Figure 3, over half of the interviewees felt that the collaboration was 'very important' in terms of strengthening their research. Three interviewees felt, however, that the collaboration had only 'moderately' or 'little' impact in this area. The Canadian CRC Chairs seemed to emphasize the effects on the collaboration slightly less than the IDRC Chairs.

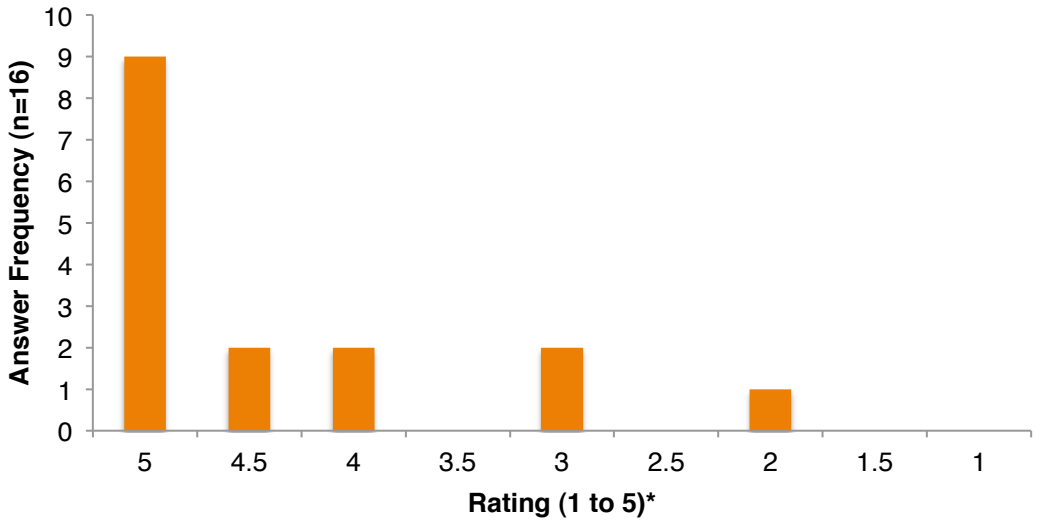

Figure 3: Chair-holders' Evaluation of the Effects of IRCI on their own Research
*Rating scale: Participants were asked to rate the importance from 1 to 5, where 5 is very important, 4 is somewhat important, 3 is moderately important, 2 is of little importance, and 1 is not important. They were given an opportunity to choose a half number between any of these categories if they felt that this number better reflected their perception.
Source: Small Globe, Inc. based on interview data.

Networks and Opportunities

We sought to assess the degree to which participation in the IRCI program broadened the horizons of participating chair-holders, increased their visibility, network of contacts, or

brought them other types of new opportunities. Our key source for this information was a question in the interview guide, in which interviewees were asked whether the collaboration led to new opportunities "you otherwise would not have had." By phrasing the question this way, we aimed to separate out any opportunities that the chair-holders felt would have come to them during any five-year period, without the additional support of the IRCI program.

Almost, but not all, interviewees emphasized that they had developed new contacts and opportunities as a result of the program. The details of the positive responses to this question fall into four main categories, with many respondents offering examples of more than one category. These categories are:

- Increased visibility and academic / research standing
- Influence on policymaking
- Involvement with the private sector
- Enhanced student experiences.

In what follows, we will discuss these themes further with examples from our interviews with chair-holders.

Increased Visibility and Standing Nearly all the chair-holders we interviewed agreed that the program had enhanced their standing among their colleagues and the overall visibility of their work. Some mentioned that this visibility had gone from being national to international (*e.g.*, Interviewee 6). Others remarked that the increased visibility afforded by the project broadened the scope of their reputation so that, for example, they were seen not only as experts in a scientific field, but also in international work and in policy change (Interviewees 11, 12, 14). This led to opportunities to serve on panels, speak at workshops, and contribute to publications outside their previous scope.

Influence on Policymaking Consistent with the observations, above, made by chair-holders about their expanded scope of expertise, a number of interviewees discussed opportunities to work in the policy realm. This ranged from working with local stakeholders and authorities to bring about grassroots, science-based policy change (Interviewee 3), to working with regional and national government agencies (Interviewees 1,5,6,10,14), to advising international organizations (Interviewees 14,15).

Involvement with the Private Sector A number of the projects funded by the IRCI developed a relationship with the private sector. Some IDRC chairs described this as a novel experience, and expressed the view that their countries were less advanced than North American countries in terms of linkages between researchers and the private sector. (Interviewees 1,10). Those interviewees whose work had included relationships with the private sector spoke positively about the experience, and emphasized how the knowledge flow from the private sector had opened up new and interesting questions in their research.

Others spoke about the satisfaction of being able to contribute to better practices in industry (Interviewees 1, 10).

Enhanced Student Experiences Although working with students was not a new activity for any of the interviewees, several (Interviewees 1, 6, 9, 12, 14, 15) mentioned their students' experiences when asked about new opportunities, and emphasized how the IRCI had allowed them to provide an enhanced learning experience for their students. One (Interviewee 6) described being able to recruit top-quality students as a result of the project, and another (Interviewee 1) said that "now, students are demanding to work in my lab!"

Additional funding A further theme that was examined in both the interviewees with the IRCI chair-holders, as well as in their final technical reports, was to what extent the teams were able to raise more funding on basis of their participation in the IRCI program. In total, IRCI grantees were able to raise at least C$18 million in additional funds from their work sponsored by the program. These funds were raised from a variety of organizations, including wide range of government agencies, private sector corporations, and in some cases, individual investors or venture capital.

Much of the additional funding was from research funding councils, such as the National Council for Scientific and Technological Development (CNPq) in Brazil, the Department of Science and Technology (DST) in India, and the Natural Science Foundation of China (NSFC), as well as Canadian funding councils, such as tri-council funding from the Canadian Institutes of Health Research (CIHR), the Natural Science and Engineering Research Council of Canada (NSERC) and the Social Sciences and Humanities Research Council of Canada (SSHRC). Some of the projects received funding from state or provincial funding councils, such as the Sao Paulo Research Foundation (FAPESP) in Brazil, and Fonds de recherche du Quebec (FRQS).

There was also additional support from ODA, including funding from the Department of Foreign Affairs, Trade and Development Canada (DFATD) and the UK Department for International Development (DFID). Some of the universities of the IDRC chairs, such as the University of Ghana and Tsinghua University, provided additional funds. Further, researchers were able to raise funds from international organizations, such as the World Health Organization (WHO); European sources such as the European Commission; and sources from the United States, such as the National Institutes of Health. Lastly, private-sector funding was reported from Google and Rio Tinto, along with some venture capital funding.

This discussion, above, does not include in-kind contributions. These ranged from relatively small-scale supports, such as external stakeholders offering the use of meeting space for dissemination efforts, to one case in which a private corporation was able to donate the use of an abandoned mine site, without which the project would not have been able to achieve

what it did. Further, the discussion on the funding of the IRCI program under-reports the actual funding envelope of the program, as it does not report the prior research funding from CRC, which the Canadian chair-holders brought to the table. As discussed above, the CRC program provides those chairs with funding for research and thus the IRCI allocates less to them for collaborating with the IDRC chair-holders.

The additional funding discussed above was earmarked for diverse purposes, for expanding the scope of the research from what was originally planned, to train students or to allow for some specific dissemination efforts. Generally speaking, the projects' success at attracting further funding speaks to their capacity to sustain the work, and to their success at networking and making connections as the research progressed. Nearly all the chair-holders expressed the opinion that the status of the IRCI program, and the new opportunities it afforded them as researchers, were important to their being able to attract additional contributions and funding. While the IRCI funding was deemed to be of high importance to carry out the collaborations supported by the program, the high level of additional funding indicates that the collaboration can be sustainable, even without additional funding from the IRCI program. The sustainability of the IRCI supported research may, however, differ according to the LMICs involved. Some of them have advanced innovation systems in place with relatively well-funded research councils whereas others lack such research infrastructures.

3.1.2 Education

A key component of the IRCI program was training and capacity-building, both in LMICs and in Canada. Table 2 shows the number of students at different educational levels reported in the final technical reports who were trained in each project. In total the IRCI supported the training of almost 400 students. What is striking is the high number of graduate students (almost equally at the masters and doctoral levels) who were supported by the program. Some of the projects trained around hundred students or more, while other trained a more modest number. This was because in some cases some of the Chairs created a research network and were able to support students who were supervised, wholly or partially, by other researchers.

Table 2: IRCI Training Data

Project	Undergraduate	Master's	Doctoral	Postdoctoral	Total
Battling Pollution in Coastal Areas	30	31	32	21	114
Helping Fishing Communities Manage their Resources	2	7	8	3	20
Tackling Mine Waste for Better Health	8	21	12	2	43
Breaking the Barriers to Internet Access	25	13	18	3	59
Getting Ahead of the Curve in Wireless Communication	2	2	22	6	32
Turning Health Research into Policy	4	0	11	0	15
Improving Child Nutrition	1	17	5	0	23
Controlling Infectious Diseases with Models and Math	7	48	28	9	92
Total	**79**	**139**	**136**	**44**	**398**

Source: Small Globe, Inc., adapted from IDRC internal document (M. Robertson and D. O'Brien (2015). IRCI and ICURA: Project Profiles and Synthesis of Emerging Results) and final technical reports.

As described in Section 2.3 (Methodology) above, we submitted a survey to trainees who had submitted theses or post-doctoral fellowships supported by IRCI to ask them about their training experience. Almost half the students who responded (48%) said they were co-supervised by faculty members in Canada and in LMICs, which reflects a high level of collaboration in the training.

Importance of IRCI to Trainees When we asked the students to rate the importance of the role the IRCI program played in their education, 72% of the trainees said it played a 'very important' role and '14%' said it played a 'somewhat important' role. The IRCI program played, therefore, an important role for 86% of the students we surveyed. Further, 69% of the students said the program supported their fieldwork, and 38% said that the program had supported their participation in international conferences or workshops. A total of 85% of the respondents said the IRCI program had expanded their networks. When we asked for further information on where it had expanded their network, the students responded that it was in Canada, in LMICs and also in the United States.

Enhancing Quality Judging from the survey, the IRCI program played a strong role in enhancing the quality of trainees' education. A total of 50% said it had enhanced their education 'a great deal' and an additional 39% 'to a considerable degree'. Only 1% said the program had 'not at all' enhanced their education. Thus for 99% of the students, the IRCI program enhanced the quality of the education.

New Opportunities A total of 80% of the students said the IRCI program had provided them with a new and valuable opportunity. Slightly fewer Canadian students, or 74%, indicated that the IRCI collaboration had given them new opportunities. Many of the opportunities that the students described related to academic opportunities, such as, "very unique experience to conduct detailed research". It was also clear from the comments how important the enhanced opportunities for fieldwork were. Sometimes the fieldwork was in their own countries but it could also be international, such as for the trainee who wrote that "the IRCI program gave me the opportunity to gain international field experience which was critical for my master's program but also my future employment opportunities and enhanced my learning".

Other opportunities were expanded networks, including participation in international conferences that opened the doors to future options. The program also led to chances to work with fellow students from different countries. As one Brazilian student said: "While participating in this program, I was able to get in touch with Canadian students and work together. This process was important because the research vision and the different culture made me learn a lot. Another positive point was to improve my English."

Employment Prospects We asked the students to tell us whether or not the IRCI program had increased their employability. A total of 35% said that the program had increased their employment potential 'a great deal', while 37% said 'to a considerable degree' and 6% said 'not at all'. A slightly higher percentage (48%) of Canadian students said the program had increased their employment potential 'a great deal,' but fewer (17%) said 'to a substantial degree'. Around 38% of the trainees who responded to the survey are still students, mostly full-time, so they may not yet be seeking employment. When we looked at the students who already had full-time employment, 73% said that the program had increased their employability 'a great deal' or 'to a considerable degree.'

In Figure 4 we present the results of a question that asked the trainees to evaluate on a Likert scale from one to five their agreement with statements describing potential impacts of the IRCI program. From the graph, it is clear that the impacts of the program were quite diverse. The highest rated statements were to 'Learn new skills' and 'Gain access to expertise in my own country'. Other highly-rated impacts were to 'Increase the visibility of my research', 'Complete my degree' and 'Publish in high-impact journals'. For Canadian students the most highly-rated impacts were 'Develop contacts in Canada' and 'Gain access to additional educational funding'.

Figure 4: Trainees' Evaluation of the Impacts of the IRCI Program

*Rating scale: Participants were asked to rate their agreement from 5 to 1, where 5 is 'Strongly agree' 4 is 'Agree', 3 is 'Undecided', 2 is 'Disagree', and 1 is 'Strongly disagree'. N=106.

Source: Small Globe, Inc. from survey data.

3.1.3 Knowledge Mobilization

While the IRCI program encouraged knowledge mobilization, and one of its main objectives was to identify new avenues for knowledge, policy, or technology transfer, the program did not prescribe any special type of knowledge mobilization. IRCI left it to the chair-holders to decide if they wanted to focus primarily on communities, government, international organizations, or industry in their knowledge mobilization efforts. In Table 3, we present select examples of knowledge mobilization efforts that were part of the IRCI program.

The table shows what types of intended outcome the knowledge mobilization efforts involved, a brief description of the initiatives and what is called a 'scale of innovation'. The scale of innovation is a measure of novelty and refers to whether the knowledge mobilization efforts were new to the organizations involved, new to the sub-national region/municipality, or new to the country. The table shows a wide scope of activities involving knowledge mobilization. Several new technologies have been developed, a number of initiatives have contributed to policies, both at the regional and country levels, and there have been various new, and what appear to be improved, practices adopted.

Table 3: Select Policies, Practices and Technologies--Results from IRCI projects

Project	Intended outcome	Reported achievement	Scale of innovation
Battling Pollution in Coastal Areas	*Technology*	Developed and validated environmental monitoring techniques that are sensitive to aquatic species in S. Brazil	New to country
	Policy	The regulatory agencies governing the second largest port in Brazil passed a new law based on research and advice from the research team	New to region
	Practice	The environmental monitoring agency for the agency had to adopt new regulatory practices	New to regulatory agency
Helping Fishing Communities Manage their Resources	*Policy*	Paraty government confers 'traditional' fishing rights to Trindade, a fishing community, thereby granting rights not available to commercial fishers	New to municipality
	Practice	Team was invited by Protected Area Councils in Paraty state to advise on co-management models Fishing associations trained to communicate market information and rights of access in protected, open and traditional fishing areas	New to region New to municipality
Tackling Mine Waste for Better Health	*Technology*	Developed a chemical and geophysical approach to stopping the leaching of heavy metals from exposed mine tailings	New to the region
	Practice	Research team partnered with two of Morocco's largest mining companies to pilot new approach	New to the region
Breaking the Barriers to Internet Access	*Technology*	Developed RSVP, a natural language search engine, and applied it to data mining applications. Established RSVP Technologies, a start-up company with offices in Waterloo and China .	New to country (there are similar technologies in use, but using different approaches).
	Practice	Search technology adopted by China's Weather Bureau and Min. of Agriculture to make agricultural product price information and gov't data more accessible and useful. Natural language question and answer system provides tourism information for tourists in China.	New to government ministries and farmers/tourists in China
Getting Ahead of the Curve in Wireless Communication	*Technology*	Patent application filed for antenna that would reduce cost / increase signal range. Several other scientific advances that could inform wireless technology.	New to companies (technology not yet commercialized)
	Policy	Expertise sought by India's S&T agency to develop the wireless communication research and industry	

	Practice	Expertise sought by Canadian companies	
Turning Health Research into Policy	*Policy*	The rapid response mechanism (below) informed over a dozen government studies that impacted government services Briefings to WHO used by WHO to construct guidelines for national knowledge translation platforms	New to country New to WHO and member states
	Practice	Both the Canadian and Ugandan host institutions piloted 'rapid response' facilities that enable health care providers and policy makers to request 'state of the evidence' reports before embarking on a new initiatives. PIs consulted by health services and government ministries on the design of knowledge translation platforms.	New to countries (Canada and Uganda)
Improving Child Nutrition	*Policy*	Research informed the development of Ghana's new Food Guide	New to country
	Practice	Schools and Ministry of Education participating in obesity study highlighted the importance of food quality and consumption. Changed school food programs. TV programs to promote healthy eating launched.	New to region New to country
Controlling Infectious Diseases with Models and Math	*Policy*	Modelling national HIV/AIDs incidence data leads Ministry of Health to adopt new process. Has a trickle-down effect programs that support treatment and prevention.	New to country
	Practice	An experimental / population-based intervention to prevent and treat HIV/AIDs piloted in three highly impacted prefectures. Involves three tiers of government.	New to region (Sichuan province).

Source: Small Globe, Inc., adapted from IDRC internal document (M. Robertson and D. O'Brien (2015). IRCI and ICURA: Project Profiles and Synthesis of Emerging Results) and final technical reports.

These knowledge mobilization efforts are indeed aimed at different types of organizations. Many, particularly those involving policies, are aimed at different levels of government. New practices can also be adopted by a variety of organizations, both at the community level from NGOs to government, and by industry. There were at least two projects that demonstrated knowledge mobilization aimed at international organizations, the WHO and UNICEF. Four of the projects developed new technologies. In one case, a new technology was aimed at government, i.e. environmental regulators. In other cases, new technologies were aimed at industry, including the telecommunications industry, the information technology and communications industry, and the mining industry.

Many of the interviewees mentioned that working on knowledge mobilization efforts was a new and growing development for them (Interviewees 1, 4, 7, 13). One said, for instance, "We had never before had the chance to apply modeling and to develop the science needed, and the funding made it possible" (Interviewee 4). The interviewee said, further, "before the IDRC program, we had two to three collaborations with stakeholders; now we have at least 12 to 13. I have never worked so hard at collaborating as I am now."

The 'scale of innovation' reflects that the research had a high degree of novelty. Many of the interviewees emphasized that what had changed through the course of the research project is that the users of their knowledge production were increasingly approaching them to address development challenges, reflecting the increasing perceived relevance of their research. (Interviewees 1, 4, 6, 10, 13, 16)

The teams' knowledge mobilization efforts were not without challenges. Working with government can, for instance, be quite challenging and require sustained effort. One interviewee stated: "We had monthly meetings with local authorities, which was good in terms of moving regulations and mindsets." (Interviewee 8) Another interviewee compared publishing and knowledge mobilization and said: "Most of the data was published in very nice journals. It is harder to translate it to the social level, to the administrative aspect. " The interviewee added later that "this was really new and our biggest challenge" (Interviewee 4).

Knowledge mobilization focused on industry was also very demanding, and somewhat unpredictable. For example, it could be affected because of a temporary downturn in the industry. "Because of the slump in the … market, we could not collaborate as much as we would like. We are firefighting just to survive. When the market recovers, we can do more." (Interviewee 2). There can also be a trust issue between researchers and industry. At the beginning of one project, industry was reluctant to be involved, as it did not expect the research to be relevant. One of the interviewee stated "this is the first time they [industry] feel they can trust and work with academics." (Interviewee 10) They emphasized that it was important for the research and knowledge mobilization to be grounded in the reality of industry. "When we propose solutions to companies, we need to understand their problems. You have to work with them, not against. Before it was very difficult to work with the companies." (Interviewee 10). In most of the industry-oriented collaborations, the researchers were trying to connect with existing industry, build trust and support their operation. In one case the research led to the formation of a new company.

When the connections with industry worked, they could enhance creativity and innovation. One interviewee said, for example, "Commercialization has raised new questions. The flow of thinking goes both ways". This illustrates that linkages with industry can lead to two-way knowledge flow. In order for innovation to take place, it is important to have user (industry)-producer (researchers) relationships that include science-based knowledge flow

from the researchers and experience-based knowledge flow from industry.[5] Through connecting with industry, innovation is thus strengthened, and research can flourish.

We further asked the chair-holders how important the funding from the IRCI program was to achieve the impacts and knowledge mobilization efforts that were a part of the program (Figure 5). Almost all the interviewees felt that the role of the funding was key to achieving their outcomes, and they would not have been able to perform so well without the funding support from IDRC. One interviewee, for example, said, "Without IDRC's support, none of these results would have happened," (Interviewee 10) and another interviewee said "it is rare to find funding with these features. To have explicitly long-term partnerships in a low-income country, and to include capacity-building to contribute to a cohort of scholars—this is the missing piece in research." (Interviewee 6) The importance of the program's supporting interdisciplinary was also highlighted, with one chair-holder remarking: "Multidisciplinary research is something lots of people talk about, but funding agencies are often less willing to invest. IDRC had the vision to bridge the gap". In the next section we will further examine the program design, and explore how its implementation was received.

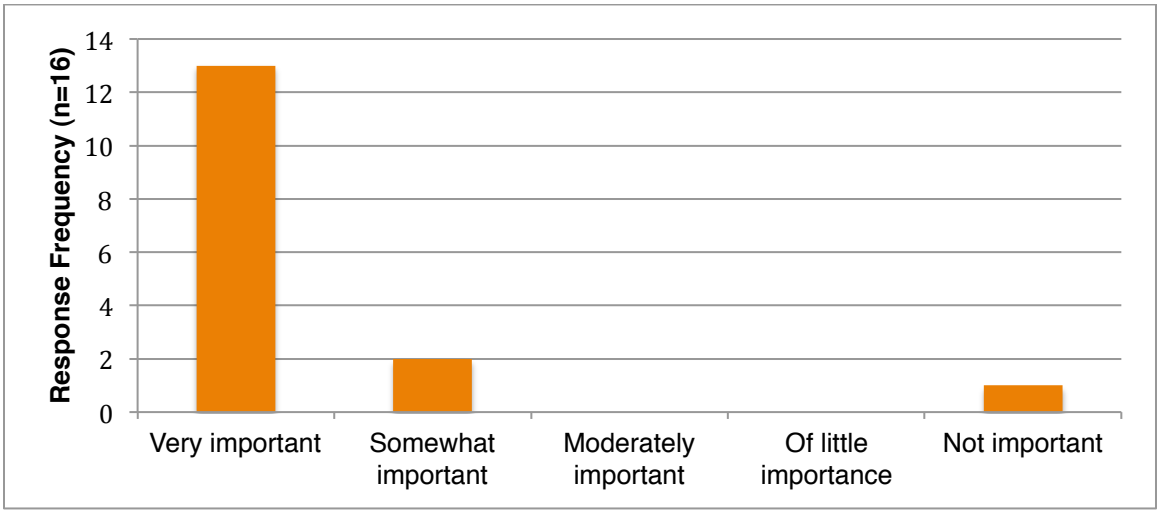

Figure 5. Chair-holders' Evaluation of the Role of Funding to Achieve Impacts
Source: Small Globe, Inc. from interview data.

[5] Lundvall, B. Å , Vang, J., Joseph, K.J. and Chaminade, C. (2009). Innovation system research and developing countries. In B. Å. Lundvall, K. J. Joseph, C. Chaminade & J. Vang (Eds.), *Handbook of Innovation Systems and Developing Countries*. Cheltenham, UK and Northampton MA, USA: Edward Elgar.

3.2 Program Design and Implementation

3.2.1 Program Design

The design of the IRCI program was aimed at building and maintaining research excellence in LMICs and in Canada. It seemed, therefore, to be an asset for IDRC to be able to work with the CRC program. The CRC program had already identified, and was working with, a cross-section of some of the strongest researchers in Canada, and had put in place an external peer-review system to help confirm that these were indeed strong researchers.

With the IRCI, IDRC was able to deepen and extend its programming, and contribute towards advancing the objectives of the Challenge Fund. The Fund aimed to leverage Canadian research funds for development; make larger-scale programming possible by sharing the resources required to run the program; stimulate collaboration between Canadian researchers and those in LMICs; and contribute towards strengthening international research in Canada. IDRC could therefore 'think big' and support fewer relatively large-scale research programs instead of many smaller ones. This would allow the Centre to play a larger role in focusing on global issues.

There were, however, concerns that introducing such a strong Canadian focus into the planned program could result in an unequal relationship, in which the Canadian partners would act as the dominant partners. To address this risk, an attempt was made to foster an equal relationship between Canadian and LMICs research chairs. Both chairs shared responsibility for effective collaboration. They had separate budgets under their control and were co-equals in determining their respective research and training plans.

A design feature of the IRCI program was thus that IDRC would give each chair control in financial decisions and have parallel financial management responsibility. Under this model, 75% of the grant went to the IDRC Chair in LMICs, and 25% to the Canadian chair-holder. As mentioned above, CRC was already supporting the Canadian chairs, so IDRC felt a 50-50 budget split would be unequal. It was also felt that the Canadian chair-holders typically had more opportunities to raise other funds than their collaborators in LMICs.

In addition to these arrangements, IDRC also organized an inception meeting at the outset of the projects at which all the teams could meet and discuss common issues. This allowed the teams to prepare for their international cooperation, as well as providing a mechanism for cross-fertilization of ideas. The inception meeting also allowed IDRC to showcase the program in Ottawa and to build more political support for this work.

3.2.2. Program Implementation and Chair-holders' Suggestions

On the whole, the chairs interviewed as part of this evaluation were positive about the overall implementation of the program, and many, even when pressed, could find little

critical to say. In the discussion that follows, we describe the views of these 16 interviewees. These interviewees provided a rich source of data for this evaluation and, given their position, were insightful on questions concerning the program's implementation.

Overall Impressions One interviewee said, for example, the following about the technical implementation of the IRCI program: "It is a special program. Really, really well done: a model program." (Interviewee 4). When we asked another chair-holder whether the program was properly designed and implemented, the interviewee said enthusiastically: "Yes, yes, yes! I am a member of parliament here in [name of country], and I am writing a proposal that we build an agency like IDRC." (Interviewee 14) Some Canadian chair-holders also emphasized the positive image the program had projected, with one saying "It puts Canada on the map, and shows outreach. [Name of country] has a mixed view of Canada, and this helps." (Interviewee 8) Others commented that it was good to call the chair-holder an International Chair, as it gave them more visibility at their institutions and elsewhere.

Fostering Equity A few chair-holders remarked that the IRCI program had been successful in encouraging equity between the chair-holders in Canada and in LMICs (Interviewees 10, 11, 16) They spoke positively about the attitudes embodied in their Canadian collaboration and compared the program and the collaborators favorably with some other Northern collaborators, whom, they felt, had expressed a sense of superiority. As one interviewee said, "you have to look for this, for partners who want to work on an equal level" (Interviewee 11) Another interviewee felt that the main lesson from the IRCI collaboration was "that equitable collaboration is possible. When one has a partner with lots of resources, there is a risk the collaboration is not equitable." (Interviewee 16)

In other words, efforts to level the playing field between the collaborators by having separate budgets seem to have worked. On the other hand, there were some who felt that the budget should have been 60-40, or even 50-50, instead of 75-25. One interviewee said: "The 25-75 split was fine, but 40-60 would be okay too. Maybe then the Canadian partners would be more motivated to participate" (Interviewee 2). One Canadian chair disagreed, expressing the opinion that "the budget split was just about right. I had enough but not too much. I would keep those proportions". (Interviewee 8)

Program Management In general, the perception was that there was flexibility and transparency in the program management at IDRC, which the chair-holders appreciated. Some of the chair-holders felt that the technical reporting of the IRCI program was too demanding and time-consuming. However, the chair-holders did generally appreciate receiving comments on the technical reports. As one remarked: "This is the first time I have ever gotten detailed comments on a report! It was great feedback." (Interviewee 5).

The chair-holders were also positive about the inception meeting in Ottawa, and felt it was a good start for the program. Most of the interviewees recommended more such meetings, and felt they were essential for cross-fertilization between projects. One of the interviewees

said, for example: "The collaborators would benefit more if the monitoring was better designed. What is needed is to share experiences arising from monitoring with other grantees. Share more learning from other grants." (Interviewee 16)

Financial Management Some chair-holders were critical of IDRC's financial reporting. There were suggestions that the reporting requirements were too demanding and could be simplified, with one interviewee saying that "IDRC spreadsheets are bad. It is the worst reporting system." (Interviewee 8) In other cases, it was difficult for the universities in the LMICs to handle the budgets, and there were misalignments between IDRC rules and budget categories, and those at their local universities. These can be difficult issues to address and it is challenging to handle diverse budgeting requirements at the receiving institutes.

Program Dissemination and Continuation Another theme that the chair-holders discussed was the dissemination of the program. The message was that this was a great program, and IDRC should do more to publicize it both in LMICs but particularly in Canada. One chair-holder said: "Being a federal funding mechanism IDRC should have more influence on federal policy; they did a good job in reaching out to [name of LMIC's] government but should do the same for Canada. If government pays more attention to IDRC we will have better policies…they should organize an end-of-program event, a high-profile meeting where they get politicians in Ottawa." (Interviewee 5).

Opening the Program The chairs felt that IRCI did not have to continue unchanged; one interviewee suggested that the program should be opened up to a wider group than only CRC chairs. This interviewee felt that it was limiting to collaborate only with CRC chair holders, and there were other researchers at Canadian universities that were a better fit for the interviewee's research focus. Considering that CRC chair-holders are not the only strong researchers in Canada, it may be possible to open up the IRCI program. This would not necessarily entail changing the funding model of the IRCI program, as strong Canadian researchers in general have good chances of raising co-funding. A benefit of opening the program up is that there are more chances of finding Canadian expertise to address key development challenges.

There are also some drawbacks to the CRC system. One is that it has been challenging for women to be nominated as CRC chairs[6]. For instance, despite attempts to ensure gender equity, only 17% of Tier 1 CRC chairs are women[7]. This is lower than one would expect based on women's representation among Canadian faculties. While three IDRC chairs are women, of the CRC chairs taking part in the IRCI program, only one is a woman. It is possible that by opening up the IRCI program, IDRC could avoid such gender imbalances in its programming.

[6] The Council of Canadian Academies, Strengthening Canada's Research Capacity: The Gender Dimension, Ottawa, 2012.
[7] http://www.chairs-chaires.gc.ca/about_us-a_notre_sujet/statistics-statistiques-eng.aspx

Continuity Lastly, many of the interviewees felt strongly that the IRCI should continue, and develop into a long-standing program (Interviewees 1, 2, 3, 4, 6, 8). The chairs in general felt the program had proven its value and there was full reason for IDRC to continue it. "To capture the full benefits though, it should last longer: should be a program" (Interviewee 3)

Based on our evaluation, we believe the implementation of the IRCI program was sound and rigorous. We also observed that the IRCI program focused on research addressing important development challenges. There were efforts made to align the IRCI projects with development challenges through the requirement for them to fit within one of four IDRC programming areas. Still, because external reviewers may not have awareness of key development challenges, the review process may have favored scientific merit rather than development application. For future programming of this nature, IDRC should be transparent in defining what falls within the realm of key development challenges, and communicate this with the external reviewers. In IDRC's current strategic plan there is a move towards greater private sector involvement in the Centre's programming.[8] With this increased emphasis on private sector participation, there is a heightened need to be transparent about IDRC's agenda and to communicate this to all those involved in the process.

3.3 Comparisons with Similar Programs

International cooperation between high- and low-and-middle income countries, funded jointly by domestic research councils and overseas development aid organizations, has become more commonplace in the past decade. Examples of this type of arrangement include:

- The Science and Technology Research Partnership for Sustainable Development (SATREP) organized by the Japan Science and Technology Agency (JST) together with the Japan International Cooperation Agency (JICA), established in 2008.[9]
- the Swedish Research Links, organized by the Swedish Research Council and the Swedish International Development Cooperation Agency (SIDA);
- the Swiss Programme for Research on Global Issues for Development (r4d programme) organized by the Swiss National Science Foundation (SNSF) and the Swiss Agency for Development and Cooperation (SDC); and
- the Scheme, funded jointly by the United Kingdom's (UK's) Economic and Social Research Council (ESRC) and its Department for International Development (DFID), established in 2005.[10]

[8] IDRC Investing in Solutions: Strategic Plan 2015-2020. International Development Research Centre 1-10.
[9] Japan Science and Technology Agency. *About SATREPS*. Available at: http://www.jst.go.jp/global/english/about.html
[10] Arnold, E, Javorka, Z. *Independent Review of the 2005-2008 ESRC / DFID Joint Research Scheme.* Department for International Development, 2009. Available at: http://r4d.dfid.gov.uk/Output/180480/Default.aspx

Other examples of joint programming involving research councils include, for example:

- the South Africa – Norway Research Co-operation on Climate Change, the Environment and Clean Energy (SANCOOP) funded jointly by South Africa's Department of Science and Technology and Norway's Ministry of Foreign Affairs and managed both by the National Research Foundation in South Africa and the Research Council of Norway; and
- the Newton Fund, which is part of the UK's ODA, administered by its Department for Business, Innovation and Skills together with a number of organizations such as the Research Councils UK (RCUK), a strategic partnership of the UK's seven Research Councils, and the British Council. The Newton Fund, established in 2014,[11] also emphasizes setting up joint programs with research councils and other relevant organizations in LMICs, and has, for example, a joint program with the National Commission for Scientific Research and Technology (CONICYT) in Chile.

These efforts represent a drive for domestic research councils to expand their horizons internationally and work with LMICs on shared global challenges, as well as recognition by ODA that science, technology and innovation have roles in international development. In general, these programs all share a focus on global challenges and an acknowledgement that international cooperation is required to address them. A further theme shared by these programs is an emphasis on mutual benefits to all participating countries.

Scope and Reach The programs differ, however, in their thematic scopes and their geographical reach. Some programs cover wide areas, such as the Swedish Research Links,[12] which is open to researchers from all academic disciplines, and includes theoretical, empirical, basic and applied fields of research; or the Swiss program[13] that is focused on reducing poverty, global risks and the provision of public goods, and has both an open stream and thematic areas. Others are more confined to certain areas such as the Scheme, which funds research in social science for development,[14] or SATREP, that funds particular areas, i.e. environment and energy, bioresources and disaster prevention and mitigation. [15] The geographical spread of the programs differ also, with some focused on all LMICs and

[11] Department for Business Innovation and Skills (UK). Newton Fund: building science and innovation capacity in developing countries. Policy Paper. Available at: https://www.gov.uk/government/publications/newton-fund-building-science-and-innovation-capacity-in-developing-countries/newton-fund-building-science-and-innovation-capacity-in-developing-countries

[12] Vetenskapradet. *Swedish Research Links*. Available at: http://www.vr.se/inenglish/researchfunding/ourgrants2015/swedishresearchlinks.4.7e727b6e141e9ed702b8de1.html

[13] Swiss Agency for Development and Cooperation and Swiss National Science Foundation. Factsheet: Swiss Programme for Research on Global Issues for Development. Available at: http://www.r4d.ch/SiteCollectionDocuments/r4d_factsheet.pdf

[14] Arnold, E, Javorka, Z. *Independent Review of the 2005-2008 ESRC / DFID Joint Research Scheme.* Department for International Development, 2009. Available at: http://r4d.dfid.gov.uk/Output/180480/Default.aspx

[15] Japan Science and Technology Agency. *Research Fields and Areas.* Available at: http://www.jst.go.jp/global/english/area_of_research.html

others, such as the Swedish Research Links,[16] only aimed at low- and lower-middle income countries, or the Newton Fund, which partners with 15 countries, including all the emerging economies, Brazil, China, India and South Africa.

The IRCI program has a wide focus on LMICs, and includes projects involving lower income countries such as Uganda, lower-middle income countries such as Ghana and India and upper-middle-income countries, such as Brazil and China. This wide focus enhances the possibilities of building on existing research ties among chair-holders.

Equity by Design Another special feature of the IRCI program, which is not shared by the other programs, is the co-PI arrangement, with PIs coming from Canada and LMICs for each project, and having independent budgets. As discussed above, this promoted equality among the chair-holders. In the Scheme program, PIs can be from either Britain or LMICs. Researchers from LMICs can therefore be in leading roles in the program. Still, according to an independent evaluation[17], PIs under the Scheme rarely come from Southern countries, and the UK researchers tend to be in charge while the Southern participants' role is to collect data.

The Swedish Research Links requires applications to be jointly submitted by a Swedish researcher and researchers in LMICs, but the grant is administered by a Swedish University, or by another public sector organisation that fulfils the requirements of the Swedish Research Council for an administering organization.[18] While it is possible that the Swedish Research Council approves organizations in LMICs to be administering organizations, it is likely that most in this initiative come from Sweden. It is, however, likely that programs that partner with organizations in LMICs, such as the Norwegian-South African program mentioned above, will have PIs from LMICs who are in charge of the grant. While the co-PI arrangement is a special feature of the IRCI program, PIs from LMICs may be in leading positions in some programs under other types of arrangements.

Training Another feature of the IRCI program is its strong training component, with almost 400 trainees supported by the program, and the way training is incorporated into research cooperation in the different countries. Capacity-building can often be part of international cooperation programs, but there is limited information available on the extent of such efforts. The evaluation of the Scheme program called for increasing participation of Southern PhD students. Other programs, such as the Newton Fund, have dedicated resources for capacity-building. The Newton Fund has a specific funding category, called 'People,' aimed at improving science and innovation expertise in participating countries, but

[16] Vetenskapradet. *Swedish Research Links*. Available at: http://www.vr.se/inenglish/researchfunding/ourgrants2015/swedishresearchlinks.4.7e727b6e141e9ed702b8de1.html

[17] Arnold, E, Javorka, Z. *Independent Review of the 2005-2008 ESRC / DFID Joint Research Scheme.* Department for International Development, 2009. Available at: http://r4d.dfid.gov.uk/Output/180480/Default.aspx

[18] The Swedish Research Links Program. International Collaborative Research Grant. Available at: http://www.vr.se/inenglish/researchfunding/applyforgrants/callforproposals/closedgrants/theswedishresearchlinksprograminternationalcollaborativeresearchgrant.5.4b1cd22413cb479b8055727.html

this category is not integrated with research cooperation activities. Within the IRCI program, the integration of training and research helped the students advance their networks and learn specific skills, such as working with the users of their research results, where tacit learning, or learning-by-doing, plays a considerable role.

Merging Approaches In many of the programs discussed here there appears to be a cultural gap between the research councils and ODA arms of the programs. Often, the ODA organizations have focused on transferring already-developed expertise or technologies to LMICs, or promoting highly applied research efforts, using established methods. New knowledge production involving ambitious research projects on shared challenges is a novel approach for them, but is typical conduct for the domestic research council. It may be challenging for the two different types of organizations to reconcile their different approaches. The evaluation of the Scheme, for instance, emphasizes that most development work is more applied and operational in character.[19] In a similar vein, the SATREP program emphasizes that it will not support technology transfer or research involving surveys or simple operations that is not going to advance science and technology.[20]

IDRC has, from the outset, had a strong focus on supporting research and new knowledge production.[21] Working with the CRC program and promoting high quality research cooperation with LMICs may not be stretching IDRC to the same extent as some of the other ODA-based organizations.

Program Size The IRCI program is also different from many of the programs listed above in terms of its size. It allocated C$8 million[22] to eight research teams and ran one round. By comparison, the budget of the Scheme was £12.5 million (about C$26 million), supporting 46 projects through three calls;[23] the Newton fund is £75 million (about C$ 154 million) a year for five years;[24] the r4d program from Switzerland allocated CHF 97.6 million (about C$133 million), from 2012 to 2022, or over C$13 million a year;[25] and the SATREP program supported 99 projects in 43 countries between 2008-2015, in which each received about

[19] Arnold, E, Javorka, Z. *Independent Review of the 2005-2008 ESRC / DFID Joint Research Scheme.* Department for International Development, 2009. Available at: http://r4d.dfid.gov.uk/Output/180480/Default.aspx
[20] Japan Science and Technology Agency. *Research Fields and Areas.* Available at: http://www.jst.go.jp/global/english/area_of_research.html
[21] Government of Canada. *International Development Research Centre Act*, R.S.C. 1985, c. I-19. Section 4.1.
[22] IDRC. IDRC Challenge Fund: International Research Chairs Initiative. Available at: http://www.idrc.ca/EN/Programs/Science_and_Innovation/IDRC_Challenge_Fund/Pages/IRCI.aspx
[23] Arnold, E, Javorka, Z. *Independent Review of the 2005-2008 ESRC / DFID Joint Research Scheme.* Department for International Development, 2009. Available at: http://r4d.dfid.gov.uk/Output/180480/Default.aspx
[24] Department for Business Innovation and Skills (UK). Newton Fund: building science and innovation capacity in developing countries. Policy Paper. Available at: https://www.gov.uk/government/publications/newton-fund-building-science-and-innovation-capacity-in-developing-countries/newton-fund-building-science-and-innovation-capacity-in-developing-countries
[25] Swiss Agency for Development and Cooperation and Swiss National Science Foundation. Factsheet: Swiss Programme for Research on Global Issues for Development. Available at: http://www.r4d.ch/SiteCollectionDocuments/r4d_factsheet.pdf

100 million yen a year,[26] or C$1 million. With such high funding levels, there is clearly more capacity for these programs to have impact compared to a smaller effort such as the IRCI program. The IRCI program is, however, not the only Canadian program involving cooperation between domestic research councils and ODA organizations. IDRC has, for instance, launched joint programs with other Tri-Council organizations, such as with the SSHRC and CIHR. Still, even when the funding for all these programs is added together, Canada's contributions to such programming is not on par with the other countries listed above.

Useful Insights Some of the programs have particular design features that IDRC may want to consider. For instance, the Newton fund offers what are called Mobility Grants. These are smaller grants in which researchers can fund reciprocal visits for up to a year to explore a potential cooperation.[27] This allows researchers to test the waters and strengthen their ties to prepare for larger-scale collaboration.

Another specific design feature that IDRC should consider is to establish specific support for researchers with knowledge mobilization efforts. The Scheme, for instance, established what they called an *International Research Broker* to increase the impact of the research on policy and practice. This was, however, applied late in the operation of the program, and as a result, had limited impacts.[28] In order to make a difference, such support would need to be integrated from the beginning in the project. Considering the high value the IRCI program places on identifying new avenues for knowledge, policy, or technology transfer, IDRC may want to consider including an International Research Broker, but integrate the brokering function from the onset of new programming.

It is clear, then, that there is substantial variety in the range of joint programs supporting research cooperation with LMICs, and there is scope for learning and cross-fertilization from the program designs of these diverse programs.

4. Conclusion and Recommendations

Based on our evaluation, we believe that IRCI has met its objectives. The relatively large research grants of the program and its long timelines allowed the research teams to:

- Implement joint research programs. Our interviewees emphasized that the program allowed them to collaborate in research. The substantial percentage (20%) of the journal articles co-authored by collaborating chairs published under the program also reflects the collaborators' high level of cooperation.

[26] Japan Science and Technology Agency. *About SATREPS*. Available at: http://www.jst.go.jp/global/english/about.html
[27] The Royal Society. Newton Mobility Grants. Available at: https://royalsociety.org/grants/schemes/newton-mobility-grants/
[28] Arnold, E, Javorka, Z. *Independent Review of the 2005-2008 ESRC / DFID Joint Research Scheme.* Department for International Development, 2009. Available at: http://r4d.dfid.gov.uk/Output/180480/Default.aspx

- Advance knowledge generation on a wide range of issues that appear to have had concrete uptake in policy and practice in LMICs.
- Mentor a large number of graduate students and post-doctoral fellows who are, collectively, likely to have far-reaching impacts throughout the world.
- Build bridges for transfer of knowledge, applied practices, policy and technologies.
- Engage with the users of their research results proactively in relationships involving bi-directional knowledge flow, thereby strengthening the potential for innovation based on the research.
- Work in relationships that are generally perceived as having promoted equality between researchers in LMICs and Canada.

The program would have benefited from a number of improvements.

- Given the strong response at the application phase, it is clear that there is scope for increasing the size of this, or similar programs, in the future. Further, similar programs internationally have had greater impact by devoting more resources to this type of work and ensuing continuity over time.
- Opening the program up to all university researchers in Canada could increase the pool of applicants and ensure that the program does not perpetuate any selection bias that may exist in some funding programs.
- Improving financial reporting would facilitate the reporting process and make it less onerous.
- Creating more opportunities to share strategies and knowledge gained during the course of the grant could have strengthened the teams' outcomes.
- Enhancing dissemination of the program would encourage more buy-in for international cooperation involving LMICs by Canadian decision-makers, and promote IDRC's role in promoting international development.
- The objective of the program is to address key development challenges, but what falls within the realm of development needs to be made more explicit, and communicated to all those involved in the program management, particularly external reviewers.

As a result, we believe that the IRCI program achieved its objectives, while raising some important issues to address in future programming.

4.1 Performance

We evaluated the performance of the program with respect to research, mentoring and knowledge mobilization activities, reflecting the core objectives of the IRCI program.

a) *Strong knowledge production.* The IRCI supported substantial knowledge production in a wide range of areas spanning diverse academic fields. The work was

disseminated both globally, often in high-impact journals, and also through more regional vehicles. The research in general has been well-received, with some papers winning awards.

b) *Mentoring the next generation of scholars and practitioners.* The aim of IRCI was to mentor the next generation of scholars and practitioners by providing training and fieldwork opportunities to students. The program trained nearly 400 students from a range of LMICs and from different parts of Canada. Furthermore, these students judged the training to be of high caliber, and to have enhanced their skills and opportunities in various ways. This integration of research and training was an important component of the IRCI program, and is missing in many new programs in this area. This substantial programmatic emphasis on training also ensures that the effects of the IRCI program will be felt for a long time in the future. In addition, focusing on training in LMICs can be beneficial to Canada: by connecting Canadian and LMICs students, the potential for future cooperation is enhanced and can positively affect both knowledge production, and commercialization in Canada.

c) *Promoting new avenues for knowledge mobilization.* A further objective of the IRCI program was to identify new avenues for knowledge, policy, or technology transfer. Given the extensive knowledge mobilization efforts described above, we believe that the program has achieved this. These efforts are quite novel, with new policies and practices introduced in regions, municipalities and countries. There was also novelty for some in working with industry, and for another, in forming a company. From the interviews, it was clear that working with external stakeholders was, in many cases, a new experience for the chair-holders.

d) *Building on strengths.* In most of the projects, the chair-holders had been engaged in prior research cooperation with each other, often for years, but the IRCI program made it possible for them to deepen and expand this cooperation. There is further scope to examine in greater depth what factors and conditions made it possible for the IRCI program to meet its objectives. Focusing on strong researchers both in Canada and in LMICs was without doubt of significant importance in the program's success. Experienced researchers typically attract capable students who are dedicated to advancing their fields. With much of the research carried out by students in the IRCI program, the capabilities and dedication of the students mattered considerably. Being connected to the local research infrastructure at universities in LMICs, and having the recognition the IDRC chair status gave them, also facilitated the chair-holders' connections with external stakeholders, so that their research fit better into local innovation systems. Because the program did not require that the research to be of direct relevance to Canada and Canadian innovation, it was not necessary to align the research to innovation systems in two or more countries. As long as the expertise from Canada was aligned with the needs of the LMICs, the program met its objectives.

4.2 Relevance

We evaluated the IRCI program in terms of how relevant the program was in informing policy and practice, the importance the program played in achieving the output and outcomes of the research teams, and its key strengths and weaknesses, including in comparison with other similar programs.

a) *Relevance to diverse audiences.* The IRCI cooperation seems to have been well-received by governments in LMICs and by other external stakeholders, including a few industries. Over the life of the program, the chair-holders were increasingly involved in knowledge mobilization efforts in their countries, and we are now seeing the impact of this involvement in policies, practices and technologies. We also saw high levels of additional funding to the research teams, often from local sources. These speak to the relevance of the program to the participating countries.

b) *Key role of IRCI.* Our evaluation found that the IRCI program brought added value: the outcomes of the program would not have been realized without support from IDRC. Without the funding, the researchers would not have had the impacts their research had. Several of the interviewees stressed that the program had encouraged them to focus more on the applicability of the research, and the complementary expertise afforded by the collaboration allowed them to move into more applied areas.

c) *Strengths and Weaknesses*

i. Equality in the collaboration. Another important feature of the IRCI program is having research chairs both in Canada and LMICs with independent budgets. This promoted equality within the cooperation, reinforced by each chair being responsible for their own budget. In similar programs working in this sphere, researchers in LMICs appear frequently to be dependent on budget allocations from their collaborators in high-income countries, which can lessen their standing in the collaboration. Our interviews suggest that this equality was very important to the investigators, and contributed to the strength of the collaborative relationships and the project outcomes.

ii. Small scope and untapped potential. A weakness of the IRCI program, compared to other joint programs, is its relatively small size. The budget of the IRCI program was only a small fraction of the other programs we analyzed. These larger programs can afford to have multiple calls and ongoing activities supporting sizable project portfolios. As a result, similar programs are able to have much greater impact than the IRCI program. There was a large demand for the IRCI program in Canada and

in LMICs. Out of over 100 letters of intent, only eight projects were funded, suggesting that there may be significant untapped potential in Canada and LMICs for programs of this type.

iii. Knowledge-sharing among teams. A further challenge for the IRCI program was the limited opportunities offered for cross-fertilization among the projects. The eight teams met together only once, at the outset of their projects. The researchers would have benefitted from more opportunities to share and discuss different approaches to their collaborative work with their other IRCI colleagues.

iv. More dialogue on what constitute key development challenges. The aim of the IRCI program was not only to encourage collaboration between Canada and LMICs, but also to produce research that addressed 'key' development challenges. There needs, however, to be more transparency in establishing what constitutes key development challenges, and communicating this within all stages of the program.

4.3 Recommendations for Future Programming

The IRCI program had some notable successes in promoting relevant and productive research collaboration between LMICs and Canadian researchers. Based on our summative evaluation, we identified lessons for future programming. We recommend that IDRC:

1. **Continue the IRCI Program.** IDRC should look at ways to continue to have a program such as the IRCI that connects university researchers in LMICs and Canada. Their joint efforts and multi-directional knowledge flow strengthen each group, making their research more visible, enhancing their impact, and allowing them to address global issues. Building these bridges is important for addressing challenges in an increasingly-connected globe. In many cases, what is needed to address pressing problems is multidisciplinary contributions. To make such cooperation possible in the future, programming of this sort is of the utmost importance.

2. **Expand IRCI's Flexible Approach to Other IDRC Programs.** The flexible, less prescriptive approach to programming has worked well in the IRCI program, and we recommend that IDRC continue this approach. Having an open call brought fresh, relevant themes to IDRC programming, and opened the door to varied contributions and stakeholder engagement. While flexibility is important, it does not have to be at the expense of lessening IDRC's focus on key development challenges. Further, one of IDRC's strengths is the corporation's ability to work with diverse cultures in an open, flexible manner that is focused on deliverables and impacts. This quality is important in diverse contexts and can lead to valuable outcomes in working with a variety of stakeholders. It was another strength of the IRCI that the focus was on

development impacts in LMICs, and no requirements were made for impact in Canada, which facilitated the projects' meeting their objectives.

3. **Continue to Emphasize Training for Long-Term Impact.** We further recommend that IDRC continue its strong emphasis on training in its future research collaboration programming. The training aspect of the IRCI strengthened the program's current and future impacts, to the mutual benefit of Canada and LMICs.

4. **Fully Investigate the Effects of Prior Collaboration.** It is important for IDRC to examine further the extent to which relatively large-scale projects supporting international research cooperation should be based on the research teams having had some prior collaboration. As this evaluation focused on a program with only eight projects it is hard to make generalizations on basis of our observations but it can be challenging for teams to start working together for the first time in a demanding, large-scale project. By examining its past programming, IDRC can gain deeper insight into the importance of prior collaboration. For those who are starting out in international cooperation, IDRC should offer smaller-scale project options.

5. **Offer More Opportunities for Grantees to Meet.** IDRC should consider arranging more meetings between research teams in the different research projects. Such meetings offer cross-fertilization and allow researchers to learn from each others' experiences in working with external stakeholders and addressing other cooperation challenges. Such meetings would play an important role in strengthening programs such as IRCI. They would, in addition, help publicize the program and its outcomes and build policy-makers' buy-in of the program and IDRC's programming more generally.

6. **Initiate Dialogue on Development Challenges.** IDRC should explore ways to encourage more discussion on what is sees as key development challenges to be be addressed by its programs, and communicate this with those involved at every stage of its programs. This would strengthen IDRC's justification for its programming agenda and ensure that it is clearly focused on key challenges.

7. **Expand the program to all researchers at Canadian universities**. IDRC should consider opening up the IRCI program to all faculty at Canadian universities, rather than only to CRC research chairs. The CRC chairs have more resources for research than other faculty, and fewer teaching demands, but research is an integral component of the job for all university faculty in Canada. Strong researchers in Canada generally have the capacity to raise additional research funds, so the IRCI funding formula could remain the same. This would increase the ability of IDRC to identify Canadian researchers who work in priority areas, as it would be choosing teams to support from a larger pool of applicants.

8. **Explore Trilateral Collaboration with Emerging Economies.** Another option that IDRC should pursue is to develop an IRCI-type program together with funding councils in emerging economies. These programs could be in IDRC's programming areas, and aimed at needs in lower-income countries. Such a program would involve trilateral cooperation between researchers in Canada, emerging economies, and lower-income countries. It should require co-funding from funding councils in the emerging economies. The funding formula could, for example, be divided 50-25-25, where IDRC would pay 50% to researchers in low-income countries, and 25% to Canadian researchers, but the funding council in the emerging economies would pay 25% to researchers from their own countries. With increased funding devoted to research in emerging economies, opportunities for researchers from those countries to raise additional funds are becoming more and more on par with Canadian researchers.

The lessons learned from the IRCI program raise exciting programming options for IDRC, and will help develop diverse new program opportunities. With an ever-changing landscape and the emergence of new global problems, it is important for IDRC to develop proactive programming to address those challenges.

Appendix 1: Projects Supported by IRCI

TITLE	PROJECT LEADERS	PROJECT SUMMARY
Battling Pollution in Coastal Areas	**Adalto Bianchini** IDRC Research Chair in Environmental Health and Management Federal University of Rio Grande Brazil **Christopher Wood** Canada Research Chair in Environment and Health McMaster University Canada	The research team developed alternative management strategies to restore and preserve threatened aquatic ecosystems in Brazil.
Helping Fishing Communities Manage Their Resources	**Alpina Begossi** IDRC Research Chair in Community-Based Resource Management State University of Campinas Brazil **Fikret Berkes** Canada Research Chair in Community-Based Resource Management Natural Resources Institute University of Manitoba Canada	The research team generated integrated approaches to help fishers in Brazil manage local resources, diversify their income sources, and increase food security.
Tackling Mine Waste for Better Health	**Rachid Hakkou** Chaire de recherche du CRDI en gestion et stabilisation des déchets industriels et miniers Université Cadi Ayyad Morocco **Mostafa Benzaazoua** Chaire de recherche du Canada sur la gestion intégrée des rejets miniers sulfureux par remblayage Université du Québec en Abitibi-Témiscamingue (UQAT) Canada	The research team conceived treatment methods to reduce the environmental impact of mining waste from abandoned mines.
Getting Ahead of the Curve in Wireless Communication	**Ranjan K. Mallik** IDRC Research Chair in Wireless Communications	The research team developed affordable technologies to increase the accessibility of wireless

	Indian Institute of Technology Delhi India **Robert Schober** Canada Research Chair in Wireless Communications University of British Columbia Canada	communications in developing countries.
Breaking the Barriers to Internet Access	**Xiaoyan Zhu** IDRC Research Chair in Information Technology Tsinghua University China **Ming Li** Canada Research Chair in Bioinformatics University of Waterloo Canada	The research team found ways to break barriers to Internet access in China.
Controlling Infectious Diseases with Models and Math	**Yiming Shao** IDRC Research Chair in Modeling and Management of Communicable Diseases National Centre for AIDS/STD Control and Prevention China **Jianhong Wu** Canada Research Chair in Industrial and Applied Mathematics York University Canada	The research team brought together medical scientists and mathematicians to find ways to contain the spread of diseases in China.
Turning Health Research into Policy	**Nelson Sewankambo** IDRC Research Chair in Evidence-Informed Health Policies and Systems Makerere University Uganda **John Lavis** Canada Research Chair in Knowledge Transfer and Exchange McMaster University Canada	The research team sought to better understand how research evidence can improve health in Africa.
Improving Child Nutrition	**Anna Lartey**	The research team developed integrated interventions to improve

	IDRC Research Chair in Nutrition for Health and Socio-economic Development in Sub-Saharan Africa University of Ghana Ghana **Grace Suzanne Marquis** Canada Research Chair in Social and Environmental Aspects of Nutrition McGill University Canada	child nutrition.

Appendix 2. Interview Guide: Chair-holders

General description

1. What were the main **reasons** you chose to take part in this collaboration?

2. How did you **divide** the work between the two groups?
   Overall contribution?
   To the proposal development phase?
   To the data collection phase?
   To data analysis?
   To writing publications?
   To training activities?

Evaluation

3. How **significant** do you think the outcomes of this project were?

4. If you were to **rate** the significance of **the outcomes of this research** on a scale from one to five, where
   - five is *very important*,
   - four is *somewhat important*,
   - three is *moderately important*,
   - two is *of little importance*, and
   - one is *not important*,

   which would you choose?

5. What **impacts** did the collaboration have on your own research?
   In terms of quality, visibility, and networking?

6. In terms of **strengthening your own research**, if you were to rate the effects of the collaboration on a scale from one to five where:
   - five is *very important*,
   - four is *somewhat important*,
   - three is *moderately important*,
   - two is *of little importance*, and
   - one is *not important*,

   which would you choose?

7. Did the collaboration lead to new **opportunities** you otherwise would not have had?

8. Did this project lead to you obtaining any **additional funding?** Did it lead to your obtaining any **in-kind contribution**s?

If so, from where? would you have been able to receive the funding without support from IDRC?

9. How effective was the collaboration was in enhancing **students' learning experiences**?
   If so, how?

10. Has the cooperation had, or is it likely to have, **applied impacts**, besides furthering research and training?
    If so, how? (on policy, practice, technology)?
    What (factors/conditions/policies/programs) made those impacts possible?

11. On a scale from one to five, how **important** was the **funding for this project** to achieve those impacts, where
    - five is *very important*,
    - four is *somewhat important*,
    - three is *moderately important*,
    - two is *of little importance*, and
    - one is *not important*,

12. What were the **key challenges** in this project?

13. Was there anything the **funder** could have done differently that would have increased the outcomes/impacts of your work?

14. Are there local or national **factors** that would have **strengthened the impact** of this project?
    Any policy, regulation, program, practice?

15. Do you plan to **continue** this collaboration?
    How sustainable is it?
    What, if any, are the barriers to sustaining the collaboration?

Design/Management of the Program

16. Was the IRCI program properly **designed and implemented**?
    - *Call for proposal?*
    - *The selection process?*
    - *The inception meeting?*
    - *Program and financial monitoring?*
    - *[Dissemination support?]*

17. What do you see as the main **strengths and weaknesses** of the program?

18. What **changes/adjustments** would you recommend to strengthen the program?

19. Do you know of any **similar programs** that IDRC could use for inspiration for future program development?

20. IDRC likes to emphasize applied research and partnerships with user groups, such as communities, industry and government. How do you think IDRC can **best promote these partnerships,** without forcing them?

21. What **important lessons** about international collaboration, and programs to support it, did you learn from this collaboration?

22. Is there anything else you would like to discuss that you feel is relevant to this topic?

23. For those who have experience of private sector involvement or are likely to have thought about this issue:

In its newest strategic plan IDRC emphasizes more private sector involvement and scaling up research results. What do you think of this approach, and how do you think IDRC can best carry it out?

Appendix 3: Trainee Survey

Please be assured that all answers will be kept confidential.

1. Current location :_____
Please indicate city and country.

2. Please indicate all the degrees you have completed and name the educational institutions where you completed them:

		Name of Educational Institution
Bachelor	□	_____
Masters	□	_____
Doctoral	□	_____
Post doctoral	□	_____
Diploma	□	_____

Other degrees and where completed: _____

3. What is your employment status?
Please select all that apply

I am in a full time position	□
I am in a part time position	□
I am self employed	□
I am a part time student	□
I am a full time student	□

4. Please indicate which degree the IRCI program supported:

Bachelor	□
Masters	□
Doctoral	□
Post-doctoral	□
Diploma	□

Other degrees, which ones: _____

5. How did the IRCI program support your education?
Please select all that apply

Fully funded my degree	□
Partially funded my degree	□
Supported my participation in local conferences/workshops	□
Supported my participation in international conferences/workshops	□

6. Did the IRCI program support your fieldwork?

Yes □
No □

Please specify the location of your fieldwork: _____

7. Did the IRCI program support your exchange visit?

Please specify the location of your exchange visit: _____

8. What was your supervisory arrangement?

Please select a single option

I was supervised only by a faculty member at a Canadian university □
I was supervised only by a faculty member in my home country □
I was co-supervised by faculty members in Canada and in my home country □

9. How important a role did the IRCI program play in your education?

Please select a single option

Very important □
Somewhat important □
Moderately important □
Of little importance □
Unimportant □

10. How important was it to your education to study, or do research, in a foreign country?

Please select a single option

Very important □
Somewhat important □
Moderately important □
Of little importance □
Unimportant □
Not applicable □

Please explain the reason for the option you chose.

_____
_____
_____

11. Did the IRCI supported collaboration enhance the quality of your education?
Please select a single option

A great deal □
To a considerable degree □
Somewhat □
Little □
Not at all □

12. Did the collaboration supported by the IRCI program expand your network of contacts?
Please select a single option

Yes □ No □

If yes, where did the collaboration mostly expand your network?
Please name the country/countries:

_____

13. Did the IRCI supported collaboration enhance your learning experience?
Please select a single option

A great deal □
To a considerable degree □
Somewhat □
Little □
Not at all □

14. Did the collaboration supported by the IRCI program provide you with a new and valuable opportunity?
Please select a single option

Yes □ No □

If your answer was yes please describe the opportunity:

_____
_____

15. Did the collaboration supported by the IRCI program increase your potential for employment?
Please select a single option

A great deal □
To a considerable degree □
Somewhat □
Little □
Not at all □

16. Please indicate your agreement with each of the following statements.

The IRCI supported cooperation made it possible for me to:

	Strongly agree	**Agree**	**Undecided**	**Disagree**	**Strongly disagree**	**Not applicable**
Complete my degree						
Learn new important skills						
Gain access to important expertise in Canada						
Gain access to important expertise in my home country						
Gain access to important expertise in another country/countries						
Publish in high impact journals						
Gain access to additional educational funding						
Contribute to new/improved policy/practice						
Benefit from new and improved teaching methods						
Gain access to new and improved teaching material						
Strengthen my ability to advise my community						
Develop important contacts in Canada						

Develop important contacts in my home country						
Develop important contacts in other low-or-middle income countries						
Increase the visibility of my research						
Get employment in my field after graduating						
Contribute productively to my employment						
Gain employment in Canada						
Gain employment in my home country						

Please feel free to provide comments or clarifications on any aspects of the survey

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If you have any questions or concerns about the survey please contact:

Fjóla Evans
Small Globe Inc.
Email: fjola@smallglobe.org